REMARKS/ARGUMENTS

1. Status of the claims

With entry of this amendment, claims 1, 3-4, 6, 11, 17, 21 are canceled, claims 7, 8, 16 and 14 are amended and claims 25-32 are added. Claims 2, 5, 9, 12, 13, 15, 18 and 19 are canceled with entry of the Amendment.

2. Support for amendments to the claims

Support for the amendments to the claims can be found throughout the specification, the drawings, and the claims as originally drafted. Support for "90% identity" can be found on, e.g., page 5, line 31 of the specification. Support for introduction of a sequence to inhibit gene expression thereby inducing early flowering can be found on, e.g., in the sentence spanning pages 2-3 as well as on page 15, lines 23-31 of the specification. No new matter is introduced.

3. Restriction

The Examiner stated that claims 1-9 and 14-21 should be canceled because they are drawn to a non-elected invention. Applicants believe that the Examiner mistakenly listed the wrong claims in the Office Action. Applicants note that Group I was elected. Group I, according to paper no. 11, includes claims 1-5, 7-10, 12-16 and 18-20. Applicants have canceled claims directed to antisense constructs, but have retained some of claims 1-9 and 14-21 as directed to the elected invention.

4. Interview

Applicants thank the Examiner for the helpful interview. In view of the interview, it is Applicants understanding that the subject matter of claims 7-8, 10, 14, 16, 20 and 22-26, directed to aspects of full length OsEMF1 sequences, is allowable.

Therefore, the following discussion addresses claims directed to sequences of at least 100 nucleotides, which were not discussed in any detail in the interview. This subject matter is now recited in claims 27-32.

5. Enablement Rejection

The Examiner contended that while Applicants had taught sequences encoding SEQ ID NO:2, Applicants had not taught sequence fragments that can be used in sense orientation to elicit co-suppression. Apparently, it is the Examiner's position that undue experimentation would be required to inhibit endogenous plant gene expression using the recited fragments (at least 90% identical to a 100 nucleotide sequence of SEQ ID NO:1) to induce early flowering in plants. Applicants respectfully traverse the rejection.

The proper test of enablement is "whether one skilled in the art could make or use the claimed invention from the disclosure in the patent coupled with information known in the art without undue experimentation." *See, e.g.*, MPEP § 2164.01. As identified by the Patent Office and the Federal Circuit, whether undue experimentation is required by one skilled in the art to practice the invention is determined by considering factors such as the amount of guidance presented in the application and the presence of working examples. *Ex parte Forman*, 230 USPQ 546 (Bd. Pat. App. & Int. 1985); *In re Wands*, 8 USPQ2d 1400 (Fed. Cir. 1988). As described in Wands, "a considerable amount of experimentation is permissible, if it is merely routine, or if the specification in question provides a reasonable amount of guidance with respect to the direction in which the experimentation should precede." *Wands*, 8 USPQ2d at 1404 (quoting *In re Jackson*, 217 USPQ 804 (Bd. Pat. App. & Int. 1982).

The specification teaches that co-suppression sequences introduced into a plant can be of various lengths (page 15, lines 29-30), do not necessarily have to include coding sequence (page 15, lines 13-15) and need not have absolute identity (page 15, lines 23-31). Therefore, in contrast to the Examiner's statements, the specification does provide for using the recited fragments for use in co-suppression.

It appears that the Examiner further doubts whether gene fragments will actually suppress gene expression. Applicants submit that, as of the filing date of the present application,

those of skill in the art would have understood that fragments of genes can be used to effectively silence genes in plants. Indeed, at the time of the present invention, silencing genes using sense-orientation gene fragments was well established.

For example, on page 15, line 10, the specification cites (and incorporates by reference) Stam *et al., Annals. Bot.* 79:3-12 (1997) (Exhibit A). Stam *et al.* was published four years before the present specification's filing date, and therefore does not even represent the cutting edge of the art. Nevertheless, Stam *et al.* teach that co-suppression "is now frequently used to study gene function...." *See*, Stam *et al.*, page 5, right column, last sentence of first full paragraph. Thus, the use of co-suppression cannot be considered anything other than a routine laboratory technique.

Methods for insuring high frequency of co-suppression using polynucleotides comprising sense-orientation sequences were also well-established before the filing date of the present invention. Therefore, those of skill in the art, using the sequences and disclosure of the present patent application, could have readily suppressed OsEMF1 expression in plants using the recited polynucleotides. For example, the art demonstrates that while sense strand RNA alone can often lead to suppression of expression, introduction of inverted repeats into polynucleotides comprising sense-orientation sequences can improve the frequency of inducing the suppressive effect. Waterhouse *et al.*, *Proc. Natl. Acad. Sci. USA* 95:13959-13964 (1998) (Exhibit B) taught that dsRNA formed by either complementary transcripts of a transcript with complimentary regions were highly effective in sequence-specific suppression of RNA. *See, e.g.*, Waterhouse *et al.*, page 13963, right column. Thus, those of skill in the art would have understood that the frequency of inducing co-suppression can be improved by introducing inverted repeats or other sequences resulting in complementary RNA.

This effect is further supported by Singh *et al.*, *Biochem Soc Trans.* 28(6):925-7 (2000) (Exhibit C), which described success suppressing gene expression with a sense-orientation sequence alone, but obtained even greater frequency of expression when inverted repeats and/or intronic sequences were introduced into the transgene. Thus, those of skill in the art were well aware of how to optimize co-suppression transgenes for optimal effect.

Those of skill in the art as of the filing date of the present application were also aware that only small segments of contiguous complimentary sequence, rather than complimentary to the whole transcript, were necessary to suppress gene expression. For example, Thomas *et al.*, *Plant J.* 25(4):417-425 (Feb., 2001) (Exhibit D) taught that as few as 23 nucleotides of complimentary contiguous sequence was necessary to silence green fluorescent protein (GFP) in plants. Thus, those of skill in the art would understand that sequences of the present claim scope (using sequences at least 95% identical to at least 100 contiguous nucleotides of SEQ ID NO:1) would be effective to silence OsEMF1.

While Applicants do not debate that some standard experimentation may be necessary to identify an optimal sequence for silencing, the above-described results clearly demonstrate that those of skill in the art can repeatedly do such work to use silencing fragments as recited in the present claims. Accordingly, Applicants respectfully request withdrawal of the rejection.

6. Written Description Rejection

The Examiner rejected claims 1, 4, 7-8, 10, 14, 16, 20, 23 and 24 as allegedly not properly described under the written description requirement. The Examiner contended that while Applicants had taught sequences encoding SEQ ID NO:2, Applicants had not taught sequence fragments that can be used in sense orientation to elicit co-suppression. The Examiner also argued that the Applicants had not taught which domains were necessary for activity. Applicants respectfully traverse the rejection.

As discussed above, it is Applicants understanding in view of the interview that claims 7-8, 10, 14, 16, 20 and 22-26 fulfill the written description requirement.

With regard to claims 27-32, directed to sequences at least 95% identical to at least 100 nucleotides of SEQ ID NO:1, Applicants submit that the present application provides sufficient detail for those of skill in the art to identify any and all of the sequences encompassed by the present claims. Indeed, those of skill in the art as of the present filing date were capable of identifying any sequence of at least 100 nucleotides within SEQ ID NO:1. Moreover, those of skill could have easily generated any sequence at least 95% identical to such sequence. Thus,

based on the specification, there is no question what sequences are encompassed by the present claims (in contrast, for example, to a claim directed to "human insulin", which lacks any reference to a sequence).

Moreover, Applicants submit that the recited gene fragments need not encode any active protein since, as discussed above, the application teaches that gene fragments can be used for sense suppression. Such fragments do not need to encode any particular domain of a protein, and indeed, they can include non-coding sequence, and still have a silencing effect.

Since the recited sequences are readily identifiable from the specification and the sequences need not encode a functional protein to have a biological (silencing) activity, Applicants submit that the Examiner has not set forth a *prima facie* written description rejection. Accordingly, Applicants respectfully request withdrawal of the rejection.

7. ***Anticipation Rejection***

Claims 1 and 4 were rejected as allegedly anticipated by Sasaki *et al.* The Examiner argued that Sasaki *et al.* described sequences that comprised at least 100 contiguous nucleotides encoding a sequence at least 95% identical to SEQ ID NO:2. Applicants respectfully traverse the rejection.

Since claims 1 and 4 are canceled, the rejection is moot. Moreover, all presently pending claims directed to sequences at least 95% identical to at least 100 nucleotides of SEQ ID NO:1 are directed to expression cassettes comprising the heterologous promoter operably linked to the sequences. Sasaki *et al.* does not teach or suggest such expression cassettes. Accordingly, Applicants respectfully request withdrawal of the rejection.

CONCLUSION

In view of the foregoing, Applicants believe all claims now pending in this Application are in condition for allowance. The issuance of a formal Notice of Allowance at an early date is respectfully requested.

If the Examiner believes a telephone conference would expedite prosecution of this application, please telephone the undersigned at 415-576-0200.

Respectfully submitted,

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